

REPORT OF THE
COMMISSION
OF
ENQUIRY -
C.E.C.

COMMISSIONERS:-

ABEL FELIX



SHENDIAL BHAGWANDAS

C O N T E N T S O F R . E . P O R T

Letter to Comrade Leader

Interim Report	a
Summary Findings	b
Summary Recommendations	c
Introduction	d, e, f
Capsule Report	g, h, i

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Maintenance	1 - 10
Conclusion Maintenance	10 - 11
Contracts re Expansion	12 - 23
69KV and Garden of Eden	17 - 21
Schedule 5 Amended Contract	21 - 23
Garden of Eden at time of crisis	24 - 27
Walcott	27 - 28
Shawinigan	28 - 31
GEC as sub-contractors	31
Zenith	31 - 32
Legal Advice	32
Certificates	33 - 35
Task Force	36
Stores	37
Versailles	38
69KV Line	41
Sophia	41
Canefield	42 - 43
Training	44 - 45
Urgent Recommendations	46
Recommendations	47 - 50
Worker/Management Relationship	51 - 54
Moneys Owing	54 - 55

Honourable Comrade Leader:

From the day of our appointment, we have worked relentlessly to investigate, report, and to recommend.

Since this is a Public Corporation, we placed no impediment in the way of the public learning of the errors and disasters. We deemed this necessary, as the slate must be written and then wiped clean. The errors, the mal-administrators, the deficiencies and the fracture of the System, we have sought to identify. As a follow-up to this, we have put forward our recommendations.

All has been executed in the hope that out of the ashes, there may arise an efficient service, a truly public utility, which must be categorised and function as an essential service for the people of Guyana.

If in the utilisation of our efforts, we have contributed in some way towards an awareness of why the Corporation has failed, and how the course may be charted for the future, then we will have succeeded in our aim and purpose to help you, and to help our country.

Sgd. Lionel Luckhoo
Lionel Luckhoo (Chairman)

Sgd. Abel B. Felix
Abel Felix (Commissioner)

Sgd. Sewdial Bhagwandas . .
Sawdial Bhagwandas (Commissioner)

DATED this 4th day of August, 1978

C O M M I S S I O N O F E N Q U I R Y

GUYANA ELECTRICITY CORPORATION

SUMMARISED RECOMMENDATIONS..... INTERIM REPORT dated 7th July, 1978

1. Immediate purchase of a water demineralisation plant.
2. Immediate purchase of oil sampling equipment.
3. Diesel Engineer with at least ten (10) years practical experience with our installations should be brought to Guyana to supervise all diesel installations, maintenance and training of operating personnel.
4. The list of spares prepared by the O.D.M. expert, Moss, for the Garden of Eden and other diesel stations should be ordered immediately.
5. A system for security of tools at Garden of Eden should be instituted immediately.
6. Three (3) Air Conditioners should be repaired or supplied immediately for the laboratory and Storeroom at Kingston to preserve chemicals.
7. Transportation should be provided for the Chief Chemist at Kingston to visit outstations and check samples.
8. Moss' Recommendations of January 11th 1977 and September 12th 1977 should be implemented forthwith.
9. Review of personnel selected for Gas Turbine Training.
10. All accessories and auxiliaries to the operations of boilers should be overhauled.

Summary

FINDINGS

Board (Chairman)
General Manager
Chief Generation Engineer et al.

- held responsible for:-
1. No planned MAINTENANCE to Stations.
 2. Negligence failing check water.
 3. Negligence failing check oil.
 4. Negligence failing record Faults.
 5. Negligence failing enquire Why equipments breakdown.
 6. No enquiries - No reprimands when operators clearly guilty Negligence.
 7. Operating as Contractors to Corporation when lacking Engineers and Expertise.
 8. Ignoring 3 ODM experts sent to head Planning Team.
 9. Inadequate Spares.
 10. No check on Expensive Tools.
 11. Repeatedly ignoring advice of Consultants.
 12. Becoming their own Contractors thereby depleting Station staff.
 13. No standard instructions to Engineers and Operators when faults occur.
 14. No proper documentation and logging.
 15. No investigation after damage to machineries.
 16. No statistics on life of engines.
 17. No basic routine servicing.
 18. No reasonable relationship with workers - poor Personnel department.
 19. No proper safety gear.
 20. The entire Management of GEC in a deplorable condition - lack of commitment. Engineers use it as stepping stone.

STATION	G.E.C.	GENERATION	Available at 1.8.78	Why less than 50% Output?
	Installed Sets	Capacity MW		
Kingston A	1 x 5 1 x 1 -	6	.5	Boilers need retubing General overhaul. Breakdown imminent. No planned maintenance since 1972
Kingston B	3 x 10 -	30	12	
Garden of Eden	4 x 5.5 -	22	16	
Versailles	4 x 2 -	8	2	
		<u>66MW</u>	<u>30.5MW</u>	Careless use, misuse, negligence Poor maintenance have caused break downs and spares awaited. System demand ... 34 Hence load shedding still on.

VITAL TO NOTE

Unverwagt	4 x 1 -	4	2	Canefield has been commissioned and will deteriorate unless put into operation
Canefield	2 x 5.5 -	11	Not in use	
Rosehall	1 x .5 -	.5	.4	But Canefield must not be put on load except the demand is sufficient OR Canefield will be wrecked !!
No. 53	1 x .25 -		.6	
Anna Regine	1 x .5 -	.75		
	2 x 1			
	1 x 2 -	4	3	
Bartice	2 x .392-	.784	.75	Since 1 70 - we have installed 34.5MW and we have lost 39MW .!!!

Vehicles owned by G.E.C. 183 of which 83 laid up. 25 on road parapet ... stealing in progress. No maintenance ... running without oil ... deliberately?

Tools some \$1M, lost or stolen. Poor worker/management relationship.

RECOMMENDATIONS SUMMARY

C.

Maintenance

1. Planned maintenance for each Station and substation.
2. All faults must be logged. Documentation - daily log sheets with operational records.
3. Monthly reports on all planned maintenance to be sent to Chief Generation Engineer and copied to General Manager.
4. Skeleton maintenance staff at each Station. If problems acute then resort to Kingston where diesel maintenance crew in location.
5. Operating procedures should be written, and obligatory to check before starting and stopping.
6. Operations Manual and Standard Practices at each Station directing what to be done when faults occur.
7. Efficient supervision and discipline at all Stations.
8. Monthly efficiency tests to determine (a) state of depreciation of units
(b) cost of generating energy.

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9. Monitoring of all fuel and oil used at all stations.
10. All fuel and water used should be tested.
11. After every major breakdown - enquiries - Report - Action.
12. Basic Engineering materials and spares at each Station. Checks. Similarly tools.
13. Adequate staff. Reduce overtime to a minimum. Maintenance men to submit daily worksheet.

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14. G.E.C. should not (as a general rule) be its own Contractor.
15. Advice from Consultants and Advisers if rejected ... recorded notes of why not followed.
16. Stores to be resited and reorganised.
17. Complete recheck on all motor vehicles and requirements ascertained.
18. Workshop should be extended with adequate facilities and additional space.
19. Removal of unwieldly and ridiculous procedure for purchase local stores.
20. Better relations required between worker and employer. Personnel Officer?
21. Workers should be clocked in, or a better system of time keeping established.
22. Standardisation of duty time. All categories report same time. Presently foreman 1/2 hour later, Engineers 1 hour later.
23. Incidents savouring of sabotage e.g. sand in motor vehicles, running without oil should be investigated. Action taken.
24. Diesel fitness certificates etc. should be issued only after proper inspection and performance not in theory but practice.
25. Independent legal advice. Panel of lawyers for all Corporations.
26. Removals - Engineer Walcott from Garden of Eden, Stuart from Kingston; Compton Singh - Versailles
27. Moneys outstanding at 1.8.78 \$12,000,000. This must be collected now.
28. New structure necessary - Guystac unnecessary.

URGENT - IMMEDIATE

1. Experts should be enlisted from abroad. We feel sure Canada - U.K.-Commonwealth Secretariat would help.

Presently - No General Manager at GEC
Deputy General Manager leaving
Financial Controller leaving
Chief Generation Engineer on leave
Transmission Engineer on leave
Chairman on leave.
2. Experienced Service Engineer for Manufacturers (preferably) to work along with ODM adviser and local counterparts re diesels.
3. An expert of the Buss type to be brought to Guyana. Commissioners feel he has correct approach and we are informed his services may be available as he is retiring.
4. Such other persons as may be identified in the Task Force Reports.
5. Adoption and acceptance of Reports
(a) Kingston - Wolstholme & Baker 1
&
Candy 2
(b) Training - D. Brown
(c) Stores - Lewis
6. Urgent decision re Canefield NOW.

COMMISSION OF ENQUIRY

Guyana Electricity Corporation

Introduction

In 1966 the Guyana Electricity Corporation planned its first independent 5 year schedule for the improvement and extension of its system. Primarily this was aimed at increasing the installed capacity of the fast growing Central Georgetown system and extending electricity to the rural areas.

For the very large capital investment required for extra capacity and additional transmission lines in the Georgetown system a team was sent to England to negotiate reputable contractors' finance packages. The team was successful in obtaining an agreement with the Bank of England and a Consortium to finance the project and returned with a preliminary agreement. This project was intended to meet the need for additional capacity by 1972.

While this team was away the Guyana Government was made aware that the IBRD had earmarked a loan to Guyana for the development of its electrical system and hence a decision was made to utilize this source of funds rather than Contractor's Finance.

In 1969 the Guyana Electricity Corporation therefore prepared a feasibility report on the need to provide economic, efficient additional generation and transmission facilities in a format acceptable to the IBRD and officially applied for financial assistance to carry out the project. The IBRD accepted the feasibility of the project in 1970 and recommended that Consultants be engaged to prepare a Development Plan for the Bank's appraisal. The Shawinigan Engineering International Company Limited was retained by the Guyana Electricity Corporation and their report was accepted by the Bank in 1971 as the Guyana Electricity Corporation Power Systems Extension - Stage 1. This programme planned for completion in 1976 was to meet electricity demand to 1977.

At that time the cost of the project was estimated at U.S. \$23.8 million and the financing had been arranged on a multi-national loan basis as follows:

- (a) International Bank for Reconstruction & Development (I.B.R.D):
Project Engineering, Frequency Converters, Frequency
Standardisation and Management Training Programmes U.S. \$6M
- (b) Canadian International Development Agency (C.I.D.A.):
69 KV transmission lines, 69 KV sub-stations and
69 KV river crossings U.S. \$4M
- (c) Overseas Development Agency, U.K. (O.D.A.):
36 MW diesel generating Plant and conversion of
small diesel generators U.S. \$7.5M

(d) Guyana Government (G.E.C.):

Local materials and construction labour U.S. \$6.3M

The programme involved the following -

1. the building of two new generating stations, one at Garden-of-Eden of 24MW capacity and one at Canefield of 12MW capacity;
2. the construction of a 69 KV transmission line from Linden to No. 53 Village, Corentyne;
3. the erection of a frequency convertor station at Sophia of 30 MW capacity to convert 50 Hz generation at Kingston Station to 60 Hz;
4. the installation of substations to interconnect all generating stations between Linden and Corentyne - Guybeu, Garden-of-Eden, Versailles, Kingston, Onverwegt, Canefield, New Amsterdam and Everton;
5. the conversion of all G.E.C. end customers 50 Hz equipment to 60 Hz, which has been established as the country's standard frequency;
6. the construction of the necessary 13.8 KV distribution lines to support the re-directed and additional capacity;
7. the training for an enlarged system in the areas of management, specialist engineers and technicians.

Any programme must of a necessity be implemented in phases after the initial concepts are accepted -

- (i) system studies;
- (ii) designs and specifications;
- (iii) tendering, evaluation and procurement;
- (iv) construction;
- (v) testing and commissioning;
- (vi) training.

Like any other extended programme planned in 1972 the Stage 1 Expansion Programme has suffered from the world crisis which broke in 1973. Prices for materials and equipment have escalated beyond projections of the sum of price increases and contingencies; deliveries of manufactured goods have become extended and unreliable; and engineering and labour costs have accordingly risen beyond estimates. Because of these circumstances, unpredictable in 1971, the funds earmarked for the project were found insufficient and after a prolonged re-appraisal an agreement was reached in April 1975 on a new financial package based on September 1974 projections. Guyana will have to meet any further cost increases beyond these estimates. In the September 1974 financial package the IBRD refused to increase their loan and only agreed to a re-distribution. CIDA and ODM have however agreed to increase their loans to cover escalation and those items that the IBRD loan could not then cover.

Briefly the new financial arrangement was:-

IBRD U.S. \$6 million

CIDA	U.S. \$5.172 million
ODM	U.S. \$7.703 million
GUYANA	U.S. \$20.683 million

C O M M I S S I O N O F E N Q U I R Y
G U Y A N A E L E C T R I C I T Y C O R P O R A T I O N

REPORT

We have had public and/or private sittings.

We have had almost one hundred exhibits tendered and a number of Reports produced for our perusal.

These Reports are invaluable and if they were absorbed and action taken, there would have been no necessity for our Commission of Enquiry.

In order that this Report might be easily read, we have sought to make it as concise as possible with references to certain relevant exhibits which support our findings and recommendations. We set out in summary form:

TERMS OF REFERENCE

1. To examine the operation of the Expansion Programme Stage One, of the Guyana Electricity Corporation for the period May 1972 to April 1978, and to determine to what extent the Expansion Programme has been implemented in accordance with the original plan.

2. To investigate any deficiencies and divergencies in the implementation of the Expansion Programme with particular reference to -

- (a) the 69KV Transmission Line;
- (b) the access roads and the alignment of the Transmission Line route;
- (c) the Diesel Generating Station at Garden of Eden;
- (d) the Sophia Frequency Conversion Station
- (e) modifications to the Kingston Station 11KV switchgear;
- (f) all other sub-stations within the said Expansion Programme of the Corporation.

We set out below the extent to which the Expansion Programme has been implemented.

TERMS OF REFERENCE

STATUS

1. To examine the operation of the expansion programme - Stage 1 - of the Guyana Electricity Corporation for the period May 1972 to April 1978 and to determine to what extent the extension programme has been implemented in accordance with the original plan;
2. To investigate any deficiencies and divergencies in the implementation of the expansion programme with particular reference to -

(a) the 69KV Transmission Line;

Completed from Linden to Sophia.

The remainder is in abeyance due to lack of finance. The line between Sophia and No. 53 is yet to be done with respect to construction and commissioning.

Design and specifications are finished as well as 90 per cent procurement. How will it be completed? Guyana Electricity Corporation has to find seven to eight million dollars (G). Guyana Electricity Corporation is negotiating with Caribbean Development Bank and an answer is expected by October 1978.

There has been advertisement for prequalifications of contractors and when money is available, Guyana Electricity Corporation will send out tenders to contractors who will then tender. Work will commence by January 1979, if the loan is granted in October 1978.

(b) the access roads and the alignment of the Transmission Line route;

Alignment of Transmission Line route completed, end access roads for construction identified.

Access roads for maintenance of completed line planned, and negotiation with Ministry of Works (Roads) in progress.

TERMS OF REFERENCE	STATUS
(c) the Diesel Generating Station at Garden of Eden;	Completed.
(d) the Sophia Frequency Conversion Station;	<p>Completed except for repairs to one unit which has been damaged. Damage estimated at £220,000 and our findings in connection with this unit are incorporated in the Report herein.</p> <p>The conversion of customers and the Corporation's equipment has been held up for finance. The areas finished are:- Bartica, West Berbice, (from Ithaca to Clonbrook), Ruimveldt, parts of East Bank and No. 2 Canal.</p> <p>Georgetown, East Bank, East Coast from Grove to Clonbrook and West Coast and Essequibo are not finished. The amount this will cost is \$5m.(G) Bartica and Kingston Power Stations are completed and £½m., part of the O.D.M. loan will be used to complete Versailles and Anna Regina.</p>
(e) modifications to the Kingston Station 11KV Switch Gear;	Design and procurement completed. Modification partially done. This job progress is dependent on conversion of customers' equipment.
(f) all other sub-stations within the said expansion programme of the Corporation.	Completed with the exception of Onverwagt for which there is no necessity until the 69KV is built. The intertie lines between sub-stations Canefield to New Amsterdam and Guymine, and Sophia to Kingston have been finished, but the general 13.8KV distribution is only 50 per cent completed. Finance is awaited. Six million Guyana dollars have been budgeted for the next five years.

MAINTENANCE

We are asked to investigate particularly the nature of the maintenance of the plant and equipment of the Corporation during the period May 1972 to April 1978.

We found this a nauseating exercise in which at all levels there were gross negligence, uncaring indifference and a total disregard for basic and elementary principles of maintenance, both in respect of brand new engines and equipment, as well as for older machines and boilers.

We are astounded that the persons whom we named herein should have been so unprofessional to permit the cancer of culpable negligence and bungling incompetence to bring about the damage and in some cases the destruction of valuable machinery, resulting in the loss of multi-millions to the Nation.

There are three types of maintenance:

- (a) Preventative or planned;
- (b) Daily routine maintenance;
- (c) Breakdown or corrective maintenance.

As a general statement endorsed by all of the witnesses there has been NO Preventative or Planned Maintenance, there has been some daily routine maintenance and all the maintenance given to any of the units was to seek to correct faults when a breakdown occurred.

With the exception of Kingston which is steam, all other stations are diesel operations.

The Manufacturers, the Consultants and advisers to our Corporation all recommended the use of a manual on the Operation of large Diesels and Auxiliaries. In simple language, this manual although directed to Garden of Eden is applicable to all diesels. A copy is attached hereto. The operation at Garden of Eden did not follow these instructions with consequential damage and loss to the Corporation. It is purposeless to have such instructions if they are to be ignored by those whom the Corporation has placed in charge.

We are asked to determine the causes of the failure or deficiency in the supply of electrical energy generated by the Guyana Electricity Corporation during 1977 and in particular for the period January to May 1978 hereinafter called Blackouts.

The short answer is that the Blackouts must be attributed to the failure of the Kingston Power Station.

Kingston operates with steam. There are two Stations, 'A' and 'B' which when working should produce 36MW.

Station 'A' has two boilers, No. 4 and 5, and Station 'B' boilers No. 1, 2, and 3. Since 1977 these boilers were going on and off and were being repaired to remain in service. In March all the boilers literally collapsed with the ensuing Blackouts. There was a Crisis. The health of the community apart from inconvenience became endangered. There was also loss of perishables dependent on refrigeration, and in addition equipment and industries depending on electrical supply were destroyed or suffered. It was at this time that we had to rely almost solely on generation from Garden of Eden.

From Station 'A' there is presently a negligible output from No. 5 boiler; No. 4 boiler is down. Station 'B' with three boilers are operated so that two boilers are in use at reduced pressure, with the result that there is 11MW coming from Kingston instead of 36MW.

We pause to point out that if the present situation is not corrected nor cured, Kingston can become useless. Kingston has run downhill for years in its lack of maintenance and the situation is so precarious that at any moment these boilers could do a repeat performance and engulf us in darkness again.

/WHY...

WHY DID KINGSTON FAIL?

Kingston failed because of the deplorably poor and inadequate maintenance and the failure to employ elementary procedures for preventative maintenance. On whom must the burden rest for this failure? Clearly on the Chairman, the General Manager and the Chief Generation Engineer. Direct blame must be accorded Eustace Stuart who was Chief Generation Engineer from September 1976. He said: "There was no scheduled maintenance in 1976. There was no preventative maintenance during 1976. Up to 1973 there was an annual schedule for boilers and turbines." "Planned maintenance was stopped about 1973 because of load growth."

It is no excuse to urge that load growth affected preventative maintenance. It is obvious that the day of reckoning was being postponed and that valuable units were being deliberately run downhill. No engineer worth his salt would countenance a policy of maintaining "supply" which would eventually destroy the machine rather than periodic cessation of "supply" by load-shedding so that maintenance works could be effected.

The conduct and mismanagement of Chief Generation Engineer Malcolm Stuart are inexcusable in that in 1976 and 1977 he made no efforts to institute planned maintenance. There is yet another factor which reveals gross incompetence and negligence. We refer to the type of water used. Raw or untreated water was used in boilers. This type of water contains impurities such as suspended matter, calcium and magnesium salts, as well as dissolved oxygen.

The Chemists at Kingston have given evidence, including the Station Chemist John Rene Bayley (p. 21). He said: "No. 5 boiler was retubed in 1975 but unfortunately City water was put into it and today we find it (the boiler tube) partly blocked with hardness scales. We used raw water because we did not have a water purification plant to put proper water in the boilers." /The....

The technical members of your commission would wish to explain that when impurities and salts of the raw water pass through the boiler tubes they form scales and these prevent heat transfer from tube metal to boiler water. The result is (a) reduced efficiency of boiler (more fuel required to produce the required amount of steam) and (b) the tubes deprived of a cooling medium lose their stress and rupture due to overheating.

Often times this Chemist Bayley, as well as the expert Wilson, who did the retubing and McGregor who effected the ~~commissioning~~ commissioning, have asked about getting a demineralisation plant. This water treatment plant costs about \$70,000.00 while the price of a boiler is in excess of \$1m.

It is contended and we accept that oxidisation had perforated the tubes of the boilers. Oxygen could be eliminated from the water in two ways:

- (a) By passing the boiler water through a deaerator unit, or
- (b) By using certain chemicals.

Since there are no tests at Kingston to determine the quantity of the oxygen in the water, we cannot say that the deaerator at Kingston was functioning or functioning properly. No chemicals were used to extract the oxygen. We believe, however, from the evidence, that since oxidisation caused the holes in the tubes, that the deaerator unit was not functioning.

To cite quotes re absence of Maintenance and Use of Raw Water we refer you to:-

BAYLEY (p. 22) "Load-shedding should have been brought into play at an earlier stage in order to provide for maintenance."

D.J. BROWN Training Administrator of CIDA speaking to the Engineers in September 1977, told them: "There is no substitute for preventative maintenance and failure to

/staff....

staff the stations with an adequate number of operating and maintenance personnel would be regretted in the long run"

FELIX FERRY an experienced Maintenance Superintendent, whose evidence we accept, stated: "I am the Maintenance Superintendent Kingston 'A' and 'B' Stations. Since Kingston 'B' was installed in 1962, there has been no general maintenance to the generator. There are three generators. From my knowledge I felt there should be general overhaul on No. 1 generator, then No. 2, then No. 3, all because of temperature rise. This was in 1972. I spoke to David Spence, the then Chief Generation Engineer and requested this to be done. He was very reluctant. I insisted and then No. 1 was overhauled. The condition was deplorable. I found human waste, rags, cellophane and dirt. Spence asked whether the others would be in the same way. I said yes.

(There can be no excuse for Spence's attitude and negligence in not carrying out the same exercise to the other generators.)

"Despite this, he never agreed to have No. 2 and 3 boilers of Station 'B' overhauled. At the moment No. 1 and 2 are in service. No. 3 generator is down. To overhaul No. 3 would take about two weeks and since we are limping along, it is deemed prudent not to touch No. 3 at this stage.

"Station 'A' has problems. All the boilers are gone in 'A' Station including the boiler which was acting as a purifier."

"With these down, it means that raw water might now be fed directly to Station 'B' boilers. This means sounding the death knell of the 'B' boilers. It is a matter of great alarm.

"In 1975 to 1976 the Kingston Stations were in better shape than presently. I was the Power Station Engineer for Kingston. The make-up water was a problem. The burners were not functioning properly. A water treatment plant was budgeted for but not obtained. This was imperative. We did not identify what went wrong with the burners. I returned to Kingston in March 1977. Conditions had deteriorated. I do know that annual maintenance schedule are put forward but are not adhered to."

The inevitable conclusion we reached is that the present Chief Generation Engineer Stuart is culpably negligent, but it is difficult to blame the Chief Generation Engineer alone. A situation does not deteriorate overnight. No preventative maintenance is a state of affairs which builds up. It was building up from 1972. Surely former Chief Generation Engineer Spence, and General Manager Payne, and the present acting General Manager Rogers, and even the Executive Chairman Thompson must all be visited with the sharing of blame for failing to ensure that elementary principles of engineering re preventative maintenance. These were not observed at Kingston. This state of affairs continued from 1972 to 1978, and may well be termed as the period of unabated negligence.

What is difficult to reconcile is why Stuart who was sent to Canada to be especially trained so that he could be put in charge of Garden of Eden should have been removed from Garden of Eden and then sent to Kingston, and an inexperienced, "untrained" individual Walcott named to take his place at Garden of Eden. The Chairman Thompson, and Rogers both agreed that this was a mistake, but they point out that that decision was made by the then General Manager Payne, and they were not consulted.

We would finally on the question of Maintenance point out that not only at Kingston but at all of the Stations there has been this form of neglect and blameworthy indifference to maintenance, in that only corrective maintenance received any attention.

We quote from the following:

p. 36 Versailles Felix Perry said: "only once at Versailles did we overhaul the generator. This was about two years ago. we lost three machines at Versailles because of failure of maintenance which resulted in a flash over. These alternators were burnt up. This I regard as criminal negligence."

p. 39 Ruinveldt Eldon Douglas, Area Engineer said: "I was not satisfied with maintenance there. There was no programme for maintenance of diesel machines. Only corrective

/and....

and not preventative maintenance was observed. I complained to Stuart but there was no redress. The second machine broke down because of low lub oil which was not observed. This was negligence and lack of vigilance. Heeber was in-charge of engine which broke down, nothing was done. I would ask Stuart and Rogers about planned load-shedding and get no reply ... I favour GEC's involvement in expansion but to do this we need staff. Staff had been creamed off from maintenance to work as GEC contractors."

LETTER FROM O.D.M EXPERT JOHN MOSS TO GENERAL MANAGER PAYNE G.E.C.
DATED JANUARY 11TH, 1977.

Warnings that the future reliability of the Garden of Eden Station cannot be guaranteed except they pay attention to the maintenance of the new engines. He cited in a three-page letter to the General Manager some eighteen areas which required immediate action.

These include inter alia:

"Maintenance materials: It is difficult to see how the station can be maintained effectively with such a lack of even the most basic engineering materials on site. Recommendations have been made to no avail ... permitting the engines to run with very low levels of oil ... little attention paid to log sheets of Senior Personnel fire risk is becoming dangerous ... tools have been lost or stolen and the remainder damaged by abuse ... oil changes not carried out as per manufacturers' instructions ... inadequate staff ... failure to take his continuous advice re water treatment in engine cooling system ... the station was in operation for nearly a year and there should have been some improvement but this is not the case. All of this has contributed to poor maintenance !

LETTER FROM J. MOSS TO GENERAL MANAGER DATED 12TH SEPTEMBER, 1977.

"A great improvement in the field of documentation is required both for maintenance and operation ... no entries in daily workbook, June and July a 2000 hour service on Set. 5 which should take two days took one month ... no record of peak pressures little record of routine maintenance despite a schedule prepared by him. Such maintenance may have prevented the failure of the purifiers."

/LETTER...

LETTER FROM J. MOSS TO PAT WALCOTT ENGINEER GARDEN OF EDEN DATED
16TH MARCH, 1975.

"Referring to the failure of Set 5 because cleaning and lubrication should be carried out weekly, they were in a very bad condition. No. 2 Set was impeded by corrosion which indicated fuel treatment was not functioning well or correctly. A considerable build up of sludge has taken place in the daily service tanks."

And all of this Moss blamed on lack of proper maintenance. All of these accusations remain undenied and in most cases unanswered from Thompson, Payne, Rogers and Walcott.

MICHAEL STUART BAKER

Chartered Engineer Shawinigan, speaking of Garden of Eden Power Station, said:

"The major failures of the engines, pistons and liners were due to lubricating oil starvation. The quality of the oil was not being checked. Many of the operators had minimum training before being entrusted with expensive equipment and so were not trained in maintenance.

(p. 17 of Record) When Kingston failed, the load carried by Kingston was transferred to Garden of Eden which did not allow maintenance of Garden of Eden to be carried out in accordance with schedule.

The life of a boiler is 25 years but this could be cut to two or three years if there is lack of maintenance."

CHARLES BARRY

Electrical foreman Kingston engaged in Maintenance (p. 31 Record)

"With increased volume of work and a depleted staff, maintenance started to suffer. Preventative maintenance was no longer observed. Up to now there is no schedule for preventative maintenance either drawn up or observed. It is only when equipment fail that we employ corrective maintenance. I observed a deterioration in machinery and equipment because of lack of proper maintenance.

(p. 32) This deterioration continues up to today, and so even today there is no proper maintenance. There is no maintenance pool. We are only called in when machines break down. Nothing is done to prevent the break down.

(p. 33) Because of problems at Garden of Eden all the

/maintenance...

maintenance men were taken from Kingston 'A' and 'B' Stations to do the Contractor's work for the GEC as sub-contractors. The result is Kingston was left without any experienced help. I feel that at each Station there should be a nucleus of maintenance workers and not for Stations outside of Georgetown drawing from the Central Kingston Station."

Comment: It should be observed what this worker has pointed out was substantiated by several engineers and experts viz it is uneconomical to have a central maintenance unit at Kingston serving all the stations, whereas if a skeleton maintenance staff were at each station they would be able to carry out preventative maintenance and breakdown maintenance. If the problem of breakdown is unresolved then one could call on the Kingston Station for additional skills.

ELDON DOUGLAS

"I was the Power Station Engineer for Kingston in 1975 - 76 I returned to Kingston in March 1977. Conditions had deteriorated. I do know that annual maintenance schedules are put forward but not adhered to."

EDMUND LYNCH

(p. 75) Linesman - spoke of shocking conditions of vehicles and vehicles do not even have fitness certificates.

"There is no service day. They do not put vehicles on the ramp. An emergency van for emergency crew is run without fitness certificate."

KENNETH HALL

Driver - stated that for the past six months fifty per cent of the crews were idle because of lack of maintenance.

"Drivers are not allowed to touch the engine, so if an engine fails on the road the driver is not permitted to see what is wrong. One vehicle was refused a fitness certificate five times and on the sixth occasion the police threatened to prosecute the Corporation."

LYNTON ALLEYNE

The Transport Engineer was called and his evidence was startling.

"Of 183 vehicles owned by GEC only sixty per cent were in

/service...

service. The workshop could only take three vehicles at a time and the remainder are positioned on the roadway and left there."

"At the moment there are 20 - 25 vehicles on the road from which parts and equipment are stolen. I brought this to the attention of the Senior Personnel Officer and his only reply was I must get additional security guards."

Comment: The Commission regarded this as being a startling admission of the lack of maintenance of expensive vehicles.

The witness went on to state the maintenance facilities are very far from satisfactory. He said they had to cannibalise on vehicles' parts when spares were absent and the result was good engines were stripped of their parts and so became derelicts.

CONCLUSION

Your Commissioners have no hesitation in coming to the ready conclusion that maintenance at all levels is known in only one connotation, namely breakdown or corrective maintenance, and not preventative maintenance. The attitude adopted was, as long as it is working let it work, when it breaks down then we will repair it or get a new one. This attitude and approach Your Commissioners regard as shocking and scandalous, and as being devoid of consideration. We note that while workers at lower levels have expressed concern about maintenance the management staff showed little or no interest. We find it is only the expatriate staff which has put into writing to the General Manager, to the Area Engineer and to the Generation Engineer, letters expressing shock at this continuing failure to maintain. Nowhere do we find directives issued from the Chairman, the General Manager or any of the Senior Officers to staff asking them to observe planned schedules and to follow the blueprints for maintenance. To the contrary we have Engineer Pat Walcott being guilty of such negligence as to disregard and shelve the blueprint for maintenance of Garden of Eden machinery costing millions of dollars. In his appearance before Your Commissioners it was noted that he was an arrogant individual, completely self-complacent, and the reading of whose evidence would show that his cosmetic frontage served to hide a high degree of lack of technical knowledge.

/In...

In our list of recommendations, we recommend that Walcott should be removed forthwith from Garden of Eden.

What we have done is to seek to answer in capsule form the questions asked in the Terms of Reference viz

What was responsible for Blackouts: ... Failure of Kingston Stations.

Who was responsible? ... Those in charge between 1972 and 1977 viz the relevant Chairmen of the Board during those years; Payne; Spence; Rogers; D'Avilar, and Stuart.

Now we shall go into greater detail into all matters relating to the expansion Programme.

THE AGREEMENT AND CONTRACTS RE EXPANSION

When the decision was taken to pursue an Expansion Programme, four parties were involved:

Guyana Electricity Corporation -- G.E.C.
 Ministry of Overseas Development - O.D.M.
 International Bank for Reconstruction and Development - I.B.R.D.
 Canadian International Development Agency - C.I.D.A.

The Ministry of Overseas Development (ODM) had originally agreed in 1972 to provide a Capital Aid Loan of £3.1 million towards the cost of the Electricity Expansion Programme.

2. ODM participation was agreed following approaches by the IBRD who, together with CIDA, contributed the balance of the original estimated cost of £9.575 million. Two requirements of the IBRD loan accepted by GEC, by ODM and CIDA were that GEC should (a) ensure a minimum 10 per cent return on investment and (b) set up a Planning and Construction Division to manage the expansion project.

3. Following an IBRD supervisory Mission to Guyana in June 1974 (on which ODM was represented), agreement was reached in principle at a meeting in Washington that ODM and CIDA would provide additional funds to meet cost escalations and GEC accepted the setting up of a Planning and Construction Department with a team of expatriate engineers to be provided from the United Kingdom under grant aid terms.

4. An official request was made to the British High Commission by the Ministry of Economic Development in January 1975. The agreed terms of reference for the team are attached.

5. ODM recruited Mr. J.W. Morrison, Chief Planning and Construction Engineer, Mr. E.J. Bowyer, Electrical Engineer and Mr. R.P.M. Taylor, Civil Engineer, and the Planning and Construction team arrived in Guyana during June/July 1975. On his arrival Mr. Morrison was informed that GEC had already set up their own Project Team for Stage I under Mr. Milton Rogers.

/These

These facts are all admitted by the Chairman Thompson of GEC, and the Acting General Manager Rogers.

We could get no reason from them as to why this team of first rate experts should have been cast aside. The then Chairman was D. Yankana and the General Manager P. Payne, but we regard it as a serious indictment for three top level experts to have come to Guyana and to have been brought under an arrangement with IBRD and through ODM, and then to have had their assignment summarily disposed.

They arrived in June 1975 and were ignored, until some two to three months later at the end of August 1975, when the then General Manager Payne informed them that they were to conduct a study on Stage II of the Electricity Expansion Programme. They were not experts in this field (Phase II) and what Payne was telling them is that we do not wish you, we are setting up our own team under Rogers.

There can be no excuse for the rejection of Morrison, Bowyer and Taylor, whose presence and skills and expertise could well have saved Guyana millions of dollars. The persons responsible for such a decision (except there was good reason and which we have failed to elicit) are Payne, Rogers and the then Chairman of GEC, Yankana who would have much for which to answer.

As an addendum these three individuals after a limited stay left without setting up the Planning and Construction Department. This obligation was directed to Rogers, whose contributions to effective Planning and Construction leave much to be desired.

A further point arises that GEC in making this decision to alter the agreed conditions, never obtained IBRD's approval for the change. Such actions may have detrimental repercussions to the country of Guyana in respect of future applications to IBRD.

The contract entered into between GEC and Shewinigan has been examined by Your Commissioners. Granted that the terms follow certain set principles, yet we feel that the client GEC did not

/receive ...

receive the degree of protection to which they were entitled. The contract was based on time. Time was not related to the supply of goods and equipment, and it meant that the services paid for could well run out (as it did) without the accomplishment of the objective. There were no penalty clauses inserted for the protection of the client, GEE.

We would refer to page 45 of the Record when the following evidence was given by Rogers and Stuart:

"Q: Are you satisfied with the services rendered by Shawinigan?

A: I am satisfied with the service rendered by Shawinigan. They operated always within the terms of the contract. They do not always supply the personnel as called for. There was a long term lapse for several months after the death of Shawinigan's mechanical engineer, one Gentle, who was replaced eventually by Doug Smith. Gentle's death did not in any way slow up the progress of the work, because of the situation of the expansion work. I am satisfied with Shawinigan.

Q: Are you satisfied with the contract?

A: I am not a lawyer. Clarke & Martin were our lawyers, and they approved."

(Chairman points out several instances in contract where the clients, that is the Corporation did not seem to be protected. Time was not related to work, etc., and Commissioner Felix points out to observations made by Moss in his evidence and in his letters).

"A: We were unfortunate in that the lawyers for Shawinigan in Guyana were Clarke & Martin and they were also our lawyers.

Q: This is an astonishing revelation. Surely this is unsatisfactory?

A: Well, this is what happened. We often come across

/this ...

this problem as Clarke & Martin are lawyers for other Corporations and when we should sue, e.g. damage to our vehicles we are told don't worry to do so.

Q. Then you had no independent advice re the Shawinigan's Contract?

A. Only from Clarke & Martin."

The original GEC/Shawinigan Contract was that GEC Engineers would be allocated to the Extension Programme and reporting solely to the Shawinigan Project Manager. This did occur until the project reached the construction stage, at which point GEC engineers were re-assigned to carry out various other duties, and as a result the manpower previously allocated to work under the direction of the Shawinigan Project Manager was reduced, and available only on an "ad hoc" basis.

As a result of this situation the GEC assumed the Project management in June 1976, and since that date, Shawinigan relinquished its responsibilities for Project and Construction Management which had become completely impossible. The GEC/Shawinigan Commissioning Agreement signed in December 1976 reflected the new arrangement whereby Shawinigan would be responsible for Commissioning Supervision only, again utilising engineers supplied by the GEC.

This was a grave error of judgment on the part of GEC to become their own Contractors. They had neither the skills, nor the number of Engineers to embark on such an undertaking and the responsibility must be placed on the Chairman, the General Manager, and the Project Manager, and the Board to wit: Yankana, Payne, Rogers, and the Board.

To carry out such an undertaking, staff from Kingston and elsewhere was drawn and it is no explanation for Mr Rogers to say, "It was a calculated risk to move up juniors into senior positions." One does not take risks when millions of dollars are at stake, and this once again evidences the poor judgment of those in control.

/Shawinigan....

Shawinigan thereby relinquished the Project Management in June 1976, and became responsible for commissioning only, and GEC without the approval of IBRD or ODM or CIDA, then went into the driving seat as being responsible for project and Construction Management.

An investigating letter reveals that GEC went into this new dimension with eyes wide open. On March 17th, 1975, Shawinigan wrote to the General Manager Payne for attention of Mr Rogers noting that at that time when Shawinigan were in charge of construction, the GEC crew was reducing in number despite requests for additional men:

"...We enclose copies of the minutes of the mechanical erection progress meeting held 4th March and of a letter from Mr Arden Wood of Crossley Premier Engines which substantiates our concern about the situation.

Up to date there have been many problems other than shortage of men which have caused delays on the mechanical installation programs. However many of these have been overcome and work is now progressing on two engine sets, and shortly there will be a considerable amount of work in installing the fuel transfer equipment and other yard piping, which will require a considerably larger crew than that requested for the engine installation.

Furthermore we are concerned that one of the many aims in the Corporation's policy to install the equipment was to involve men who would eventually be able to operate the station so that they would understand the layout and the mechanics of the equipment.

Unfortunately there have been so many changes of personnel in the crew since installation commenced that it is doubtful whether any of the crew will become the engine operators.

/At.....

At the present we believe that the goals of your policy may not be satisfactorily achieved and there is real danger of the mechanical installation program falling behind schedule unless you take immediate steps to remedy this situation and provide adequate manpower to meet the scheduled workload requirements."

The original idea was exemplary. Shawinigan would be responsible for Management Project and Construction, but GEC Engineers would work alongside them. Yet there in March 1975 was one of many complaints being made that when Construction was effected there would be no GEC operators carrying on who had served alongside of Shawinigan. Despite this, GEC with a show of misplaced enthusiasm and questionable ambition undertook to carry out the work, for the setting up of the other two engines at Garden of Eden. They never sought to get an extension of the existing contract with Shawinigan, but entered into a new Contract with them limiting their work to Commissioning.

EXPANSION PROGRAMME GARDEN OF EDEN AND
69KV TRANSMISSION LINES

The evidence reveals the position as follows as gleaned from Michael Baker, Chartered Engineer, Shawinigan, and supportive documentary exhibits (notes of evidence p.11):

"The original contract between GEC and the Consultants was signed on the 8th March, 1973. My involvement was to supervise the co-ordination of the GEC Personnel for the commissioning of the GEC Power Extension Programme.

I supervised the Engineers of the GEC Electrical Construction. I was not involved with any training programme. I am leaving at the end of July, 1978. Our contract terminates 30th June, 1978. GEC requested me to stay on for a month.

There were two amendments to the original contract which expired in June 1976, but basically the original contract

/was....

was the same. In December 1976, a new contract for commissioning services only was drawn up. This expires on June 30, 1978." (Scope of services read by Commissioner Felix to witness). The witness referred to the schedule contained in the scope of services which set certain dates for the scope of services. These were fixed dates. We have done our part to meet these dates, but these dates have not been met.

Q. Why have they not been met?

A. The answer is not simple. Let me go into them. Linden Power Stationmanufacturers' defects were noted but these are of a minor nature.

Re 69KV Transmission Lines Poles to Garden of Eden. The Garden of Eden to Linden Construction commenced November 1973, and was completed in February 1976... that is, two and one-half years to construct fifty-one miles. Our first problem encountered was right of way involving the acquisition or purchase of land, for the Transmission Line route. When construction was commenced there was no section set up to investigate land ownership and right of way. In 1973 there was no legislation to enable the Corporation to purchase compulsorily the right of way. The GEC had the responsibility to provide the rights of way in accordance with Clause 5 of the Contract.

The next major delay was the pole supplier was delinquent in failing to supply the poles for which he had contracted. This was a continuing delay. Guyana Timbers Limited were the suppliers and the contract stipulated specifications and all details. I do not know if there were any penalty clauses and will check the contract.

The third aspect of delay was the failure of the Contract to carry out the construction of the Transmission Line. Zenith were the contractors and they failed to perform.

/and

and were relieved of their contract. Between November 1975 and February 1976, GEC completed Linden to Garden of Eden Line.

GARDEN OF EDEN SITE

The piles for the engine block foundations had to be purchased. There were delays in the supply of piles. This retarded the commencement of the civil works which began in April 1974. The engines were ordered in August 1973, and the delivery date was given as June 1974. The date was not kept. The first engine was not delivered until September 1974. This delay was due to the miners strike in the U.K. causing a three-day working week.

Delays continued. The failure of the Transmission Lines to be completed on schedule resulted that although the first engine was ready to run in October 1975, it was not able to be put into operation until February 1976, that is a six months' delay.

During the construction of the engines, there was a problem on pipe work between GEC, Shawinigen and the manufacturers (Crossleys). The manufacturer had supplied random pipe work lengths instead of prefabricated lengths. This increased construction work. This dispute was resolved when the manufacturers agreed to fifty per cent return of total cost construction.

There were delays also in the supply of adequate stone and cement, structural steel work.

All the above resulted in additional costs and extending the services of Shawinigen. All delays produce and bring about increase in cost to the client and shortening of service by the Consultants.

There was a chain reaction. Because Garden of Eden was not completed on schedule and the GEC system demand growth increased, the existing GEC Stations had to take up the additional load growth until Garden of Eden was completed. The system was designed on Stage I, eventually

/to ...

to be succeeded by hydro electric power. Stage I was merely to bridge a gap and reinforce the existing GEC Stations.

Stage I was designed to be connected to the hydro. The original agreement was signed in March 1973. There was an amendment No.2 which attempted to set a time frame based on the known problems but subsequent to this, more delays occurred. It was then decided to write a new contract in July 1976, to give GEC access to our expertise in Canada and supervision on testing and commissioning in Guyana.

Q: Does GEC have the expertise and technical "know" to complete the programme in the absence of Shawinigan?

A: In some cases, yes. In electrical aspects, there are some personnel with the expertise, but not enough. In the mechanical field there is a shortage of mechanical engineers with relevant experience.

Q: Was this programme too ambitious for the first two years - No!
But in the light of subsequent events and constraints - Yes!

With a programme of this kind, more personnel should have been sent abroad to be trained. In Guyana there are limited number of persons who could undertake such work, and where there are several projects going simultaneously, skilled inputs are required.

I agree that the problems may be put this way. We suffered from Quantum of Personnel, Quality of Personnel - Delays and Availability of Suitable Machinery. Experience is not obtained by a six weeks' course. Experience is gained by personnel working with and alongside of trained, skilled personnel so that they may acquire similar skills.

Manufacturers merely supply the material and supervise the installations. GEC undertook to do the installations. They were their own contractors of mechanical and electrical installations. I do not know that this breached any loan agreement.

/GEC ...

GEC was major contractor. GEC would have the checks and balances,

Three Phases:-

1. Purchase equipment.

Each phase requires checking before the subsequent phase. GEC was virtually checking on GEC. Diagram tendered 'H' showed construction and commissioning flow process.

SCHEDULE 5 OF THE AMENDMENT OF THE CONTRACT

Programmed work to be finished by June 1976, but there were long delays. We did reschedule the work because of delays. We submitted a report in December 1975. We notified GEC of the delays on each occasion.

On one occasion we recommended that the contractor was requested to cease work because of delays.

Our contract states that we work under the direction of the GEC and although we make the recommendations, it is up to the GEC whether they took that advice.

There were instances where recommendations were not accepted. Details of such instances can be presented to the Commission. Quarterly Progress Reports to the three Loan Agencies were produced which set out all details. There were difficulties of the client being the contractor:-

1. This depleted the clients manpower available for inspection and commissioning. This had the effect of delaying the commissioning process.
2. With the clients doing self-inspection we could not critically evaluate the construction. In some instances the clients advertised for constructors, electrical and mechanical. We suggested that inspectors could be used for the construction process. This recommendation was not accepted by the GEC since they said they were the owners and contractors and they were responsible for their own work.

/By ...

By Inspector I mean any Inspector independent of GEC. This matter was discussed fully at a meeting with GEC dated 23.5.75. The contract says we must act as directed by the client. (Exhibit 'J' tendered).

With regard to the 69KV Line Construction, Zenith was not satisfactory, and that is why GEC terminated their contract. Some Loan Agencies insist on international bidding of contracts only if offshore finance is involved. The first section between Linden and Soedyke turn-off was inspected by Inspectors under the direction of Shawinigan.

(Off the record) - The contractor (Zenith) was terminated because of the unsatisfactory performance of the contractor when all supplies were on hand. The Construction management at that time was under Shawinigan's Contract. GEC took over construction management of the line in October 1975. Our construction management contract was up to June 1976. After that GEC took over project and construction management and Shawinigan was not actually engaged in the construction supervision. The normal process on construction would be that the consultants would have under their direction a supervisor and staff to run the site. Because of inadequacy of staff we had some contracts which were self-supervising, and therefore, had an abnormal and unsatisfactory working arrangement wherein there were not proper supervision and/or inspection of several contracts.

Q: Your contract from 8th March, 1973 to 30th June, 1976 called for certain staffing in Canada and Guyana. There was provision for a project manager and a project supervisor?

A: Yes, but not for inspectors.

The GEC construction teams should have been separated from inspection and commissioning teams.

Re Exhibit 'H': We would be responsible from completion of erection through safety clearance. Commissioning would identify many construction problems but mainly this would

/only ...

only relate to immediate problems and not to long-term problems that may occur.

Q: A letter to Crossley through GEC dated 4.3.76 and a note in that form showed defects to be corrected and an assurance was to be given by March 22, 1976. Were the defects corrected?

A: With Garden of Eden, there was one major problem, which was vibration. This was not resolved for approximately nine months. The remaining defects were cleared during a period of approximately one year.

Q: On 20.5.77 a list of defects were noted and written by yourself?

A: There are two tests on these engines, one on light fuel and the second on heavy fuel. They were minor problems on each test, but these were solved.

With reference to fuel problems, fuel must be treated before being put into the engine to get rid of the impurities, e.g. water. If the treatment is not properly executed, then water will go into the engine with disastrous results. The problem Mr. Felix is referring to is a case of the fuel oil having water in and the treatment not being properly executed or the persons treating had not been properly schooled.

There are four engines, Nos. 2, 3, 4, 5. I will table a report from the Diesel Users Association if required. At the time of commissioning the problems were minor except for vibration.

The primary cause for the failure of the electricity supply was the complete and utter failure of the Kingston Station. The Station had approximately 37MW of installed power at the time of the crisis. At the time of the crisis it could not produce any power. Compared with this, the problems of the Transmission Lines, in my opinion, were minor, and the problems on this Line were due to cane burning and unusual weather.

/STATE ...

STATE OF GEC POWER STATION AT THE TIME OF THE CRISIS AT GARDEN OF EDEN

When the Task Force was asked to go into Garden of Eden, my observations were as follows:

1. The condition of the lubricating oil in the engines was observed to be a very poor condition, which indicated that checks on the lubricating oil as per manufacturers' instructions had not been carried out.
2. Spares of minor items such as indicating lamps and fuses were not available, and these I expected to be there.
3. There were faults that had been noted that had not been corrected e.g. three weeks previously a fault was logged but not attended to.
4. There were major failures of the engines, pistons and liners which were possibly due to the condition of the lubricating oil or lubricating oil starvation. One of the observations of the Task Force is that, had a temporary filter not been left in the damage to the Station would have been more serious. The quality of the oil should be checked regularly as per the manufacturers' manual, and this had not been done for a long period of time.
5. Operations - It has been brought out to the Task Force that some of the operators are required to work excessive hours. This has been brought about by the shortage of staff. I would expect their efficiency to drop and problems with the engines would not be easily recognised. Many of the operators in the station have minimum training in heavy diesel engine before being entrusted with expensive equipment. This is to be regretted."

We have set out this evidence in extenso for this reason. At the commencement of the evidence we viewed Shawinigan with suspicion. We wanted to be assured not merely by verbal evidence, but by documentation and cross-checks that they were not blameworthy.

/The ...

The evidence taken by us points to satisfaction by GEC's management of the Shawinigan work. Our criticism is in respect of the contract. We feel that a purely time related contract for the services of Shawinigan was highly unsatisfactory. Factors such as to whether manufacturers' items would arrive was not considered. In short, the Contract did not protect the Corporation fully and the Chairman Thompson, and General Manager Rogers, blamed this on poor legal advice. They said the lawyers were most unhelpful and matters such as Wayleaves and Compensation were satisfied without legal help.

What is also highly unsatisfactory is GEC's role in failing to observe the advice given by Shawinigan. Apart from the award of Contracts for poles and other Contracts where Shawinigan's advice was unfortunately not taken, we have to make the further observations re GEC's assumption of the Construction Contract 69KV Transmission Line.

Due to the continuous problems of pole supply for the 69KV Line Shawinigan recommended in writing to the GEC on October 23rd, 1974 that all work on the 69KV Transmission Line Construction should be suspended to avoid unnecessary cost to the project (FIG. A). This recommendation was not accepted by the GEC. The 69KV Line Contractor was Zenith Construction Co-op Society Limited.

On the 10th January, 1975, Shawinigan advised GEC that the performance of Zenith was not satisfactory, and in a follow-up letter dated 24.1.75, Shawinigan further advised GEC that Zenith Co-op would not meet their commitment. In the said letter Shawinigan requested that the GEC review their recommendation to suspend construction as proposed in letter of the 23rd October 1974.

A report with a covering letter was then sent to GEC on March 13, which outlined proposals to overcome various problems being experienced during the construction (FIG. B). These proposals included the involvement of GEC forces in stringing of the lines and the award of separate new contracts for other sections of work.

/At....

At this point in time only 17.5 miles out of 51 miles of line were constructed at a cost of \$293,440 against a contract price of \$232,147 for the 51 miles of line.

A meeting was then held with the GEC on 10th May, 1975, to discuss the proposals and a copy of the minutes at this meeting are attached (FIG. C). At this meeting GEC elected to carry out all the construction work themselves and not just the stringing as originally discussed.

Under the terms of Schedule V of Amendment 2 to the then GEC / Shawinigan Contract, the Shawinigan Transmission Line Engineer's assignment was due to terminate on October 31, 1975. Due to the various slippages, it was recommended in their letter dated July 11, that this engineer's services be extended (FIG. D). This recommendation was not accepted by the GEC (FIG.E) and GEC appointed their engineer, Mr. A Daw as replacement to the Shawinigan Engineer.

As a follow-up to these decisions by GEC a meeting was held on July 31st, and it was agreed that GEC would take over the responsibility for the construction and management of the Transmission Line works and that Benith Construction Contract would terminate on October 31. Shawinigan letter dated 1.8.75 confirmed this agreement (FIG.F).

GEC's management under the guidance of Milton Rogers must accept responsibility and blame for failing to heed the advice of their consultants. GEC was paying for such advice and except for good reason, should not have discarded the same. (Copies of letters referred to are attached to this report under separate cover). Herewith brief summary of what took place:

March 1973 to June 1976: Contract GEC/Shawinigan for construction management.

December 1976: GEC became its own Contractor.
GEC takes over Construction although ill-equipped in skills and numbers. GEC did not have the Engineers. Personnel should

/have....

have been sent abroad for experience.
Shawinigan's Contract only for commissioning
services.

August 1973:

Engines ordered.

June 1974:

Manufacturers' delivery date.
Fuso Engine three months late. Delays and
more delays. Delays stone, cement, steel
resulting in additional cost.

4. Advice by Shawinigan critical of GEC being
own Contractor; absence of independent
Inspectors ignored by GEC. Construction
team should be separate from commissioning
team.

Result:

New machines just over a year old being
used with poor lubricating oil resulting
in major failure to engines, pistons, liners,
etc., all adding up to poor maintenance.
Faults noted not corrected.

Recommendation:

- (a) Urgent requirement for experienced
Service Engineer from manufacturers.
- (b) Contract with oil supplier should
stipulate oil to a specification.

What happened when GEC placed Patrick Walcott in charge of Garden of
Eden and to set up the new engines?

The questions asked Walcott and answers given p. 49 - 53 reveal
gross ignorance and lack of experience, yet this was the same
person who had to commission the new engines. Walcott had no
experience with diesels. Stuart who had some experience was
removed by Manager Payne. Payne must accept this responsibility.

Here are some typical Walcott replies....There were three
explosions. When the first occurred I did not know why. I arrived
at no conclusion. There was a crank case explosion. Again I do
not know why. I was in charge of operations.

Q: And of construction?

/I....

A: I cannot answer if I was.

Walcott observes that water in the oil does not mean that anyone was negligent. There is a difference, he said, between negligent and sharp. Set 4 suffered two pistons seizure. There was no investigation for the first explosion. The second was because of dirt. He goes on to say - I had to commission No.4 and 5. I did not have the experience to do so. I have never done it before.

Q: Would pressure fall or rise if sensing device is on the wrong side?

A: It would fall.
(Wrong it would rise)

Q: Should oil pressure not then be adjusted?

A: In no way
(Wrong)

The engine was running with water in gear box. We use one drum oil per day per engine. (Commissioner asked witness to look at his records). Asked about water tests witness said oxygen in water is of no importance beyond a certain temperature. (Commissioners.. .." you are wrong again.")

This witness was not only ignorant of basics, and ignorant, but was brash and cheeky. He is unsuited for any form of supervisory work in diesels.

Did Shawinigan have experienced diesel Engineers?

We were at pains to enquire into this aspect as this was their obligation. The suggestion that they did not, was not borne out. P.W. Gentle who had the expertise came down but died in 1973 and was replaced by D.R.G. Smith, who we were told, was an experienced Diesel Engineer. His curriculum vitae was accepted by GEC. He was responsible for the construction and commissioning of the first two engines at Garden of Eden. He left in March 1976. GEC appointed Stuart as the successor to Smith. Stuart was removed shortly after by Payne although he was supposed to have been trained to replace Smith. Why? Not even the Chairman (Thompson) could provide a reason. Shawinigan has made it abundantly clear that Smith was willing to

/remain....

remain on. This was unacceptable to GEC. Shewinigan further recommended that Smith return for the commissioning of the remaining engines. This was again unacceptable to GEC, with costly results to the Nation.

The Status and Update of Deficiencies at Garden of Eden since July, 1977

On July 21st and 22nd, 1977 Baker of Shawinigan attended a meeting in the United Kingdom with Mr. M. Rogers of the GEC, Mr. D. Buss of Crown Agents representing the ODM and the manufacturers to discuss the Engine Contract finalisation. The deficiencies outstanding at 12/7/77 were tabled with the manufacturers at this meeting.

It was agreed at this meeting that the manufacturers would send a Field Service Engineer to Guyana for one month to clear deficiencies as soon as the necessary materials were available. The Engineer arrived in Guyana on 21/9/77.

On October 10, 1977 a site meeting was called by Baker to establish the status of deficiencies. A letter was then sent to GEC on the 11th October with a report of this meeting.

As a result of a lack of progress in clearing the deficiencies, Baker called a further site meeting on 17th October, and on October 18th, informed the GEC by way of letter of the slow progress.

Also on October 17, a copy of a report from site prepared by Mr. A. Brown - Croesleya Engineer and sent to the GEC, was received by Baker, wherein it was stated "certain defects ... will not be completed ... due to unfortunate illness of several of the working (GEC) staff.

A further site meeting was called by Baker on 31st October, 1977 at which the status of deficiencies at that time were discussed. Shawinigan's letter to GEC dated November 1, 1977 listed the outstanding deficiencies at that time. Mr. A. Brown the manufacturers engineer left Guyana on November 5, 1977 some one and a half months after his arrival.

/On ...

On November 14, 1977 Shawinigan forwarded a draft letter to GEC, and GEC in turn sent the letter to the manufacturers. This letter registered the state of deficiencies with the manufacturer at the time when their engineer left Guyana, and requested certain information from the manufacturers. On December 14, the manufacturers replied with some suggestions regarding the various points previously raised.

On January 3rd and 11th, Baker, on advice from site, sent telexes on GEC's behalf to the manufacturer registering the failure of No. 5 Jacket Water Pump motor and continued wear on the timing gears that had first been noted during the original commissioning of No. 3 engine. Also a telex was sent to the manufacturers on failure of diodes on the alternators.

In reply to the manufacturers' letter of December 14, Shawinigan drafted a reply to them dated 25/1/78. This draft required information from Garden of Eden. The Station Superintendent was verbally requested on several occasions to supply the relevant information. This information was not forthcoming so on 21st February, the draft letter was sent to GEC with a request for them to exercise their influence in obtaining the information from site before forwarding the letter to the manufacturers.

It was during February 1978 that the first crankcase explosion on the Garden of Eden engines occurred, and the condition of the engines progressively deteriorated until the major power crisis on April 2nd.

Copies of letters referred to above are enclosed under FIG. 16 of the attachments to Shawinigan's letter dated 20/7/78. Copies of the front sheets of the various site meetings listed are also enclosed under FIG. 9 of the attachments.

On April 3rd, Baker was in Canada on business when Shawinigan received an emergency call from the Government of Guyana. On April 4th, Mr H.W.S. Marshall, Vice-President of Shawinigan, and Baker flew to Guyana to assist in the restoration of power to the Georgetown system. Since April 1978 Shawinigan has been actively involved, in Canada as well as in Guyana in assisting the Emergency

/Task

Task Force set up by the Government of Guyana in restoring the Electricity supply to a state of near normality. Shawinigan's offices in Canada have purchased various items of equipment on behalf of the GEC, arranged the services of manufacturers' engineers to rehabilitate the Garden of Eden engines, provided specialist Engineers to carry out a survey of Kingston B. Station, and supplied information on various subjects as requested. The cost of these services and materials have been paid for by the Canadian High Commission.

In Guyana, Shawinigan have assisted the ODM Technical Adviser, the new Station-Superintendent and the manufacturers engineers at Garden of Eden in the ordering of rehabilitation components from the manufacturers on GEC's behalf and liaising with the British High Commission on the purchase and supply of these items, and with Garden of Eden on various problems as they arose. These latter activities have recently been handed over to the GEC engineer at Garden of Eden.

GEC as sub-contractors?

We recommend that the Corporation should be reluctant to undertake any Contract work. Several witnesses have testified that when GEC became its own Contractor, skills were taken from General Management and with the shortage of staff, maintenance of established stations must suffer.

Rogers evidence (p. 47) said: "Over the last 2/3 years twelve professionals have left the Corporation and twelve more are to go. There are 25 vacancies at the moment."

ZENITH

As a local Company we were deeply concerned that Zenith had a contract taken from them by GEC. We have had representatives of Zenith before us and at our request a Memorandum was submitted by them.

The contract with GEC called for penalties if there was delay.

Penalties were claimed by Zenith to the extent of \$180,000.00

/and...

and paid by GEC, yet Rogers admits that penalties which should have been claimed by GEC against Zenith were not claimed. We gained the impression that this matter may yet be taken to Court by Zenith and so we ~~did~~ not go into details save to say that there appears to have been sound grounds for GEC terminating the Contract.

We must express great concern that whereas GEC paid out \$180,000 in penalties to Zenith, GEC has not even made a claim on Zenith for Zenith's default. What is surprising is that no explanation could be offered by anyone as to why this was not done.

LEGAL ADVICE

We feel that the Corporation requires independent legal advice. Their contracts involving millions of dollars and their day to day intromissions require legal advice. Matters as Wayleaves, Right of Way, Acquisition of Lands should have been handled through their lawyers. This was not done. Delay ensued and cost GEC large amounts. We feel that a special section should be set up in the Attorney General's Chambers (in their new building) in which a pool of 2 or 3 well paid lawyers could undertake the work of all Corporations. The expenditure of such sums would be easily justified, and be more satisfactory than the present framework. Rogers (p. 47) also makes the point advocating separate lawyers for GEC.

TAKEN FROM COMMISSIONER'S REPORT ... RE CERTIFICATES ... DIESEL ALTERNATORS

We regard as highly unsatisfactory the Certificates issued by W.F.D. Younge, B.Sc., M.I. Mech.E., whose duty is to certify Diesel Alternators.

The Certificate states that the equipment was inspected under normal working conditions ... and a declaration made that the Unit is "In very good and safe condition and capable of being worked for six months from date of examination." The unsatisfactory nature of his evidence is self-evident if one were to read it. We therefore set it out in extenso below for except there can be confidence in highly placed officers, not only the Corporation, but the entire country stands to be damnified.

How can one expect honest, straightforward dealings from junior officers when clearly to collect his one hundred dollars, this Engineer wilfully issues a dishonest certificate. One doubts whether any inspection was ever done as alleged.

An examination of the records shows that on the 19th November, 1977 Mr. Younge inspected four machines at Garden of Eden, one at Ruimveldt, three at Versailles, four at Onverwagt, and the account paid by GEC to him was \$1,247.80 for inspecting these twelve machines (including travel). This is highly improbable because of the distances involved and the location of these stations. His evidence reads as follows:-

6 P.M.

W.F.D. Young - General Superintendent of Guyana Mining Enterprise,
B.Sc. W.I.

I used to certify diesel prime movers for power stations diesels. This I did between January 1974 and November 1977. I gave it up in November 1977. I was paid one hundred dollars for each certificate for each unit.

I took over from one Ambrose. I was asked to assist and put up a tariff. I did so.

Certificates are required by the Insurance Companies to effect Insurance cover. I had to go into the station, inspect and verify that they were in proper condition, working satisfactorily and would work for another six months. These units were insured with Lloyds.

I had to take no examinations to carry out these functions. They were based on my professional qualifications.

I examined units of all diesels at the various stations throughout Guyana.

I only certified those in operable condition. If the equipment is down, a certificate is not issued.

If a machine has a broken crankshaft I would not certify it, but if it is down for minor checks I would still certify it. I was allowed to use my judgement to pass and certify a machine even though it was down and I had not seen it working. If the machine is down I would take the speed rate from the manual and put that in the certificate.

Q: Is this permitted?

A: I would say yes.

I would sometimes carry out load tests, sometimes I would not. Every other inspection I would do this load test. I could take the details from the manual. To do the load tests would take much time and I couldn't find the time. Because of the time pressure I gave up the work.

Q: Could you account for a machine which should give 2 MWS receiving your certificate on one day, and yet on the very day can only carry a load of 1 - 1.5 MW?

A: I am not aware of this. It is a question of judgement. I cannot explain how this could have happened.

A machine need not be put on full load for me to issue a certificate.

There is a presumption that the machine will carry the load for which it is designed for the next six months.

When I took on this job I was given oral but not written instructions.

I can certify a machine and another person will come and not certify it.

Q: Garden of Eden shows oil leaks which are profuse. Is this not to be written in your certificates?

A: No, not necessary. I would tell the engineer. It is all in my judgment.. I do not have to put it in my certificate.

Q: Versailles engine No. 3 was not running and yet you gave a certificate. How come?

A: I have a personal note that this engine had a broken crankshaft and repairs were started. I exercised my judgement and gave a certificate even though the crankshaft was broken.

Q: Don't you think that you should have refused to give a certificate? Or to have noted it? (on certificate)

A: At times I would trust the engineer and issue the certificates if the engineer said all would be well.

Sometimes I would inspect and not issue a certificate.

Q: What recommendations would you make for a new inspector?

A: I would recommend that machines which are down, inspectors should probe a little more deeply before issuing certificates although judgement has to be exercised.

I would often speak to Malcolm Stuart and tell them all was not well, but this was not noted in my certificates.

My impression of the outlying stations is that they should be traversed more frequently. They have problems but there is no one to advise them. There should be skeleton crews doing work at each site. They can then tell the specialist crew what is wrong.

So far as I am aware there is no one who is certifying the fitness of these diesel engines since November, 1977. The insurance company must get a fitness certificate before insuring the diesel insurance cover.

Canefield is commissioned. Bermine and New Amsterdam could be tied to Canefield. Technically it could be done. In terms of a national decision this is the best thing to be done.

If Canefield which is idle is to be put on load, the demands of New Amsterdam and Bermine and surrounding areas should be met.

A copy of the certificate re unit No. 3 Versailles which was issued was shown to the witness. This is the engine with the broken crankshaft. (Tendered). A GEC Engineer had circled in pencil and placed the word "inoperative" on the certificate.

TASK FORCE

The Task Force which came into operation with the crisis of Blackouts, certainly adopted a line of positive action. Arising out of their efforts many reports were forthcoming. The two final Reports re Kingston we commend for implementation:-

- (a) Review of Mechanical Plant Kingston B Power Station - Wolstenholme and Baker; and
- (b) Report on Electrical Plant by P.W.K. Candy.

Re (a) dated May 1978 - authorised by the Canadian High Commission, two sets of recommendations were advanced - a short and a long term recommendation. The short term was to be effective prior to the retubing of the boilers.

The most urgent problems listed are:-

1. Extremely dirty boiler on the water side.
2. Very poor combustion especially below 70% M.C.R.
3. High silt and shellfish content in the cooling water.

It recommends that:

- a) The boiler pressure parts be thoroughly cleaned at the earliest available opportunity;
- b) the existing pressure atomized oil burners be replaced by an air or steam atomized system;
- c) that dredging should be recommenced in the CW intake area; and
- d) modifications be carried out to the bandscreen washing.

The report details further recommendations necessary to improve availability to reasonable levels and to ensure a future life of 10 - 15 years.

The study is highly technical and the technical members of the Commission were much impressed by the thoroughness of its investigation and the proposals advanced. We enquired whether the immediate short term recommendations were effected, and are surprised to learn that the acting General Manager Rogers does not seem to know whether the

/GEC

GEC would carry out this work or the Task Force. This displays a hiatus between the Task Force and GEC, and we would hope that GEC undertakes to implement the recommendations forthwith. In like manner we hope the long term recommendations will be studied with a view to implementation.

We have noted the many Reports and studies have been done, and in particular we attach herewith the Report on Identification of Needs, Management and Training Programmes, for GEC. These voluminous records are very impressive, but they are valueless and unless and only of no more importance than an old discarded newspaper except they are (a) studied and (b) decisions made as to what is acceptable and (c) what action will be taken for ensuring the carrying out of recommendations. Lip service is of no use to anyone and we counsel that except there is a measure of vigilance, these valuable reports might find themselves in the archives of forgotten works.

(b) Candy's Report on the Electrical Plant may be put in the same category. His recommendations are of two types:

1. Technical for "immediate" attention, which means that it is believed action should be taken within the next 2 - 3 weeks: "not immediate", which infers that as soon as plant can be taken out of service the work should commence.
2. Organizational: put forward as possible ways for preventing of the present difficulties.

We would especially commend the sections dealing with accommodation store-keeping procedures, consumable spares, and general spares. We advise the adoption of this report and its implementation, in so far as the same is acceptable after study.

STORES ADVISER'S REPORT

Since 1977 Royden R. Lewis a Stores Adviser from CIDA came to Guyana and made a report. Nowhere do we find heed being paid to the same. In capsule form he advised:

/12..

1. That funds be procured from any source possible for a new warehouse.
2. Losses of stores have been very high and the introduction of proper warehousing practices and the organisation of stock would make for better control. The lead he gave has not been followed.
3. Proper stock-taking should be introduced and Lewis set out the procedures to be followed.
4. Fire safety standards he advised were inadequate and suggestions were offered to meet the requisite standards. These should be observed.

The advice given by this Expert should be reviewed in the light of existing circumstances and efforts made to improve on the standards non-existing.

VERSAILLES AND \$350,000 LOSS

While Your Commission was actually sitting, and whilst the newspapers were reporting the incidence of carelessness, lack of thought, inefficient management and neglect, an event occurred which we set out herewith:-

1. On the 22nd July, 1978 J. Nagessar was the acting Regional Plant Operator at Versailles.
2. At 11:59 he noted that the Station shut down because of a lightning flash i.e. No. 2 and 4 generating at 1.1 MW closed down. (First instance)
3. At 12:09 No. 2 started.
12:11 No. 2 on load.
4. At 12:33 No. 4 started
12:36 No. 4 on load.
5. At 12:55 No. 4 machine tripped out on differential Blue Phase. (second instance).
6. At 13:05 No. 4 restarted and put on load.
13:08 No. 4 tripped out on differential Blue Phase. (Third instance).
7. At 13:12 No. 4 engine stopped.
8. At 18:05 No. 4 engine restarted.

/18:07

18:07 No. 4 on load.

9. At 18:08 Over current relay trips out the Blue Phase.
10. At 18:09 Fire broke out at No. 4 Alternator. Extinguisher used to put out fire. General shut down of No. 4. No. 4 destroyed.

This valuable engine coating some \$350,000.00 appeared to be completely ruined. How?

Well Colin Singh the Shift Control Engineer Sophia said that he had noted in his log book that the Versailles No. 4 tripped out twice. The Engineer who is in charge of Sophia requested that the engine be put on test again.

Mohamed Ali, the Technical Engineer at Sophia said he had a report from Kingston that the Versailles feeder had tripped, the entire station was down. The operator requested that the machine be put back on. I (Mohamed Ali) said No! I briefed Emerson who is in charge of Sophia. We tried to get Stuart on the phone but could not, Colin Singh gave orders for the engine to be tested. Systems Control at Sophia was under the impression, says Emerson, that the machine was ready for testing and because of poor understanding between Systems Control and Versailles Power Station, the machine was put on and the serious damage resulted.

This state of affairs is grave and highly unsatisfactory. Mohamed Ali had said the engine should not be put back on. This advice was correct. The reason for tripping had not as yet been determined yet the same exercise is indulged in for a second and then a third time, namely restarting the engine.

What is regarded as poor understanding is really lack of experience. Qualifying and holding a degree is evidence of having done some study but as the real experts in this field have pointed out, that is the time when you begin to learn after qualifying, and experience can only be gained by working alongside other experienced engineers and observing what procedures are adopted when troubles occur. For this reason working manuals are essential for the guidance of all

/operators ...

operators and engineers.

If there is poor understanding, then that comes from a lack of a proper system. There should be a laid down policy in writing that when an engine trips over what lines should be followed. There are some alleged verbal and obscure instructions. It is shocking to find some \$350,000.00 damage done because basics in the system of understanding are absent, and there is no working manual and standard instructions.

We feel that the GEC Management should enquire into this matter technically in detail and provide the kind of understanding and written instructions which would obviate the engineer in charge at Sophia saying, "Poor understanding between Systems Control and Versailles are blameworthy." Colin Singh must be blamed, although the inadequate system might well have contributed to the blow up, the fire and loss of valuable machinery. This is a graphic example of what has been happening throughout the Corporation for the past years, Emerson, the person in charge may have to accept some liability for the breakdown. He knew of the tripping on several occasions and should have advised that naubtebahce was first required before any efforts at restarting engine.

RE 69KV LINE FROM SOPHIA TO GARDEN OF EDENWHY THE FAILURE?

Beker gave evidence to the effect that when there was failure of this line, he made an on-the-spot inspection. He observed that there were on some insulators what is known as corona rings. This indicated that the insulators were dirty. He went to a section of the line prior to cane burning and saw nothing.

The effect of the cane burning created spark-over and corona rings. The cane dust carbon had deposited on the insulators and as there was no rain at that time to wash this off, the carbon dust accumulated until a flash-over occurred.

Spark-over and corona is a new phase to many of the GEC Engineers. If the Engineers were experienced they could reasonably have anticipated the trip. Cleaning the line is the only way to prevent carbon build up, and a cleaning procedure after cane burning has now been implemented by GEC/GUYSUCO. If there is anyone to be blamed for the trip over it would be lack of experience in reading the significance of coronas.

DESTRUCTION OF MACHINE AT SOPHIA

There are three converters at Sophia, all new. One of them costing £220,000 without being in service was completely destroyed during commissioning that is, the entire 50 cycles main machine was wrecked. The destruction is termed by Shawinigan as "a major disaster". The bolts causing the disaster came from the pedestal bearings. This bearing is adjacent to the machine. The bolt cannot be dropped in. The only access would be through a horizontal hole where the three bolts could have been pushed in. The bolts were either carelessly left in after inspection or it was deliberate.

The C.I.D. was called in and we have seen a report that they do not feel it was a sabotage.

We have spoken to Cde Emerson in charge of Sophia and he blames

/the....

the disaster on the length of time between the preparation of the machinery and the commissioning two and a half month later. So far as we have been able to ascertain GEC never mounted a high scale technical investigation when matters such as, when was the machine covered? Who did the last inspection prior to commissioning? Were checks carried out? The incident remains. The loss is \$1 M and yet we find this lack of initiative on the part of the Chairman, the Board and Top Management of GEC.

Sophia is presently working in reverse. 60 cycles is converted into 50 cycles and being sent to Kingston, instead of Kingston sending to Sophia 50 cycles to be converted into 60 cycles, which was the original plan.

Emerson has advised, as his evidence, that there are too many engineers at Sophia. We ask that this evidence on this aspect be brought to the attention of Management and be given consideration.

CANEFIELD

We would refer to the evidence given by Baker (p. 20 of Record) re Canefield. He had this to say:

"This is a 12Mw Station. The Station is now commissioned. It was commissioned in June. If the Station is not activated, it will deteriorate unless careful maintenance is carried out. It is a Government decision to say if Canefield is to run, as Bermine generation would need to be reduced. There is a load at Crabwood Creek which could be supplied if Canefield is operated. If Canefield is not energised early then it will have to be put on a care and maintenance basis.

If we want to prevent a second Garden of Eden, then a careful scheme for selection and training of operators must be done now and an experienced engineer put in charge. If this is done and Shawinigan's recommendations were to be implemented, then this Station could be energised. We have prepared a plan which is now before the Minister and I with GEC am to discuss the programme with him. I have

/written....

written to the GEC with recommendations and not directly to the Minister concerned."

We ask that the plan before GEC be brought to the attention of the Minister with Shawinigan's recommendations. An early decision is vital as if the Station is not activated it will deteriorate.

TRAINING

An important aspect of GEC's expansion is the training of personnel, Dan Brown, was the Training Administrator, and he came in March 1976 and left in July 1978. His job was to formulate and implement a technical training programme. This programme has not been satisfactorily implemented. He said:

"We brought a man specially from Canada to train operators. He was a diesel and steam operator, but none of the diesel operators were present for training, as they could not be made available."

He protested to Mr. Rogers in writing but there was no redress. He continued to protest.

Sewh and Sam are instructors of the School, but they do not have the experience in large diesel engines. The poor operators at Garden of Eden are responsible for the breakdown there, and these people should have received training before being placed as operators. He recommended:

1. Training must be 100 per cent committal by Management, not just paying of lip service.
2. It would be desirable to have someone of my experience to take over the programme.
3. The Management has taken on persons who were sent to various Stations without going through a Training School. This is disastrous.
4. No one should work longer than 8 - 9 hours. For operators to work for long hours is also disastrous. Staff is clearly inadequate. I was told by GEC that men were available to be trained. I found out differently. The immediate requirement is to hire more people, but the right kind of people. Unless there is some incentive to the trainee his enthusiasm will wane.

The point stressed by Brown and with which we agree is that "wrong" persons have been sent for training. Specialised persons must be brought down to carry on the workings. Sending people overseas is not the answer except you select the material to be trained.

/We ...

45.

We feel that a person of Brown's qualification and experience should be brought to Guyana to carry on the training at Sophia and we so recommend.

It is disturbing to find that not one single operator took the diesel course and this blame must be visited on all of Top Management. Mr Brown said he felt frustrated in the vain endeavours to get our people trained.

URGENT - IMMEDIATE

1. Experts should be enlisted from abroad. We feel sure Canada United Kingdom - Commonwealth Secretariat would help.

It is disconcerting to envisage, GEC will be operating on the 1st September, 1978 without a General Manager, A Deputy General Manager, the Financial Controller on leave, the Chief Generation Engineer on leave, the Transmission Engineer on leave, and then to crown them, Cde D. Thompson the Chairman, has also gone on leave.

Your Commissioners feel that at this time of crisis the attitude and conduct of the Chairman leave much to be desired in that he should be going on leave when the entire top management is threadbare, and if the Chairman did wish to go on leave at this time, surely he should not have approved of his top officers taking their leave at the same time.

We feel there should be no delay in getting top expatriate staff as recommended.

2. Experienced Service Engineers from Manufacturers (preferably) to work along with ODM Adviser and local counterparts re Diesels.
3. An expert of the Buss type be brought to Guyana. Commissioners feel he has correct approach and we are informed his services may be available as he is retiring.
4. Such other persons as may be identified in the Task Force Reports.
5. Urgent decision re Canefield.
6. Adoption of Reports Wolstenholme; Lewis; Candy and Baker.

RECOMMENDATIONSMAINTENANCE

1. Planned maintenance for each Station and sub-station.
2. All faults must be logged: Documentation - Daily log sheets with operational records.
3. Monthly reports on all planned maintenance to be sent to Chief Generation Engineer copied to General Manager.
4. Skeleton maintenance staff at each Station. If problems acute than resort to Kingston, where diesel maintenance crew in location.
5. Operating procedures should be written, and obligatory to check before starting and stopping.
6. Operations Manual and Standard Practices at each Station directing what to be done when faults occur.
7. Efficient supervision and discipline at all Stations.
8. Monthly efficiency tests to determine (a) state of depreciation of units (b) cost of generating energy.

Maintenance has been the fly in the ointment and the great impediment in the workings of the Corporation. The recommendations we have listed above should be put "on load", and forms and books provided where documentation is required.

9. Monitoring of all fuel and oil used at all Stations.

We feel there is evidence of larceny of oil in many areas with strong suspicion in respect of Versailles, but since there has been no monitoring of fuel and oil, it is difficult to prove our allegations. Fuel and oil at all Stations should be checked and recorded and the records signed by the Supervisors. To the experts such information would reveal where "something is wrong".

10. All fuel and water used must be tested.

We have already dilated on the subject of tests, demineralisation plant and deaeration plant and would point out that with turbines

/coming ...

coming into operation, wrong oil would cause a major breakdown; and with the rehabilitation of Kingston boilers this becomes essential to the maintenance, to the life of the boilers. A contract should be entered into with the Suppliers to ensure the specification of the oil supply meets with our requirements.

11. After every major breakdown - enquiries - report - action.

It surpasses our comprehension how management could have been so dilatory and negligent not, not to have investigations and enquiries into major breakdowns but merely treating them as if they were Acts of God.

12. Basic engineering materials and spares at each Station.

Checks. Similarly tools.

13. Adequate staff. Reduce overtime to minimum. Maintenance men to submit daily worksheet.

At Versailles with five men there was overtime of \$13,000.00 earned in 1977, and those same five men for six months in 1978 have already earned \$10,000.00 in overtime. This is a disgraceful state of affairs where people would absent themselves on Saturday as being ill, and turn up on Sunday and allegedly work for long hours to build up their pay packets. Once again this reveals the attitude of Management. We sought to get the Financial Controller to give evidence but he is on leave and we are told is unlikely to return.

(N.B. He returned on 2.8.78 and gave evidence see later)

The general attitude of GEC is no one cares, let us spend multi-millions.

14. GEC should not (as a general rule) be its own contractor.

We have already in this Report pointed out that this was a major error and this type of error should not be perpetuated where GEC is thin on quantity and quality of Engineers to have to divert them to do contract work.

15. Advice from Consultants and Advisers if rejected ...
Recorded notes of why not followed, should be recorded.

On several occasions we asked why certain advice tendered by Consultants and Advisers was rejected. We could receive no satisfactory reply. We advised that recorded notes should be made of each occasion as to why advice is neglected.

16. Stores to be visited and reorganised.

17. Complete recheck on all motor vehicles and requirements ascertained.

18. Workshop should be extended with adequate facilities and additional space.

Each day valuable man hours which must run into staggering figures are lost because there are no vehicles to take workmen to do maintenance and repairs. Workmen are paid and remain idle because of inability to get some of the one hundred vehicles in Georgetown in motion. A larger maintenance staff seems necessary, but with that we feel there should be greater responsibility on the driver. The driver should not only be driver but should pass a proficiency test before his employment, and be aware of the elementary principles of the vehicle-care so that when sand is found in the sump, and running the engine without oil and water and the vehicle seizes up the blame will be directed to the driver and not as at the present moment where the driver says, "I am not allowed to touch the engine."

19. Removal of unwieldy and ridiculous procedure for purchase of local stores.

The cumbersome progress when viewed in detail as given in evidence shows that this procedure must be abandoned.

20. Better relations required between worker and employer.
Personnel Officer?

21. Workers should be clocked in. or a better system of timekeeping established.
22. Standardisation of duty time. All categories report at same time. Presently, Foreman - half hour, Engineers - one hour later..
23. Incidents savouring of sabotage, e.g. sand in motor vehicles, running without oil, should be investigated. Action taken.
24. Diesel fitness certificates, etc., should be issued only after proper inspection and performance not **in theory but by practice**
25. Independent legal advice. Panel of lawyers for all Corporations.

WORKER/MANAGEMENT RELATIONSHIP.

The Union gave us a version of non-co-operation and the failure of Personnel Officer to establish good relations. They complained of the absence of monthly meetings and the failure to receive safety equipment and overalls. There was a go-slow in progress which at our appeal was called off.

We invited the Personnel Officer to meet us and he spoke of inter-Union rivalry between one Wally Mohamed and Cleveland Charran, yet the Personnel Officer deals with both, as the Union Representative.

We felt it was not our duty within our Reference to get too deeply involved, but it is clear that unless the Worker/Management improves, there is much unrest pending.

(PRO's)

His revelation that a Member of the lowest category of Engineers had received some \$1,280:- in one month instead of \$332:- bespeaks the abuse wherein workers sign their own overtime sheets and an Engineer just endorses it.

The question of overtime we feel should be investigated, and measures taken to curb the abuse. It is clearly wrong to pay substantial sums for overtime instead of increasing present complement of workers.

Another aspect which should receive attention is the dishonest practice known as "Gimme One". This has resulted in a doubling of the wages bill, and is a scandalous practice which is inexcusable.

The Finance Controller, Cde Chung substantiates that overtime costs GEC over \$300,000:- per month and the organised larceny of Gimme One is in full operation as if carried on, on a rota basis. It is not only a question of a well worker being paid when he is not working, but his replacement gets double pay to boost his pay packet.

We set out below the evidence of both Johnson and Chung and ask that the observations herein be treated as recommendations:

/Oscar

OSCAR JOHNSON

Worker/Management Relation The workers complain about the lack of co-operation.

We took the opportunity of calling Cde Johnson, the Personnel Officer, and spoke with him at some length. He said that conflict arose because Wally Mohamed used to represent the MPCA. Cleveland Charran now represents the MPCA, and that since there is a power struggle between these two, that each seeks to prove himself more vigilant, yet Johnson admits that he deals with both Mohamed as well as Charran. This is clearly wrong as two rivals cannot represent the same Union. It would seek to divide the workers more.

Comrade Johnson has said in literal terms that the whole of GEC is disintegrating administration-wise. There is no decisive management. He spoke to the Chairman Thompson about it on two occasions and received a negative indifferent response. The result was he was discouraged from speaking any further with him, and has written one letter to him pointing out the problems which he is facing. He admitted to us that there were difficulties about protective clothing being issued out of time, but said efforts were being made to remedy this. He points out that the workers at GEC are basically dishonest, and cites examples of workers being paid for thirty-two hours work when they do sixteen hours work. He said it is called Gimme one. A worker will work from three to eleven when another worker should take his place but at ten o'clock the worker will report ill. The alleged ill worker is paid for his work which he does not do and the worker who wants the Gimme One, then continues to work and receives double pay for the extra time. He points out cases where the lowest category mechanic II Heeber is clearly running a racket at Rosehall, Corentyne. His basic pay is \$88.00 per week. Yet for four consecutive weeks he has been drawing for overtime \$130.00, meals allowance \$50.00, and double time work \$55.00, a matter of some \$320.00 per week, which since he did this for four consecutive weeks, gives him a salary of \$1280.00 per month; and this Heeber not only signs his own pay sheet, but there are no other signatures on the sheet and it is approved for payment. He has been objecting to these things and that is why there is some hostility towards him.

/Yet.....

Yet when we asked Johnson what he has done to stop this malpractice, the answer is nothing.

He goes on to tell us that the wages bill for some thirteen hundred plus workers at GEC for overtime work is more than double their normal wages which should be drawn. To be precise 107 per cent. Chung places this at 55 per cent.

He concludes by saying everyone wishes to get as much as they could from GEC and there is a Mafia approach in which management seems to fear the workers, that there is absolutely no discipline and to put it precisely, the entire structure for a proper running of the organisation has gone to hell.

It is not within our Terms of Reference to delve into the details of Union/Management intromissions, but we would counsel that immediate steps be taken to bring about the infusion of discipline and a sense of mutual understanding, for except this is done, impending trouble will soon fructify.

We ask that there should be an investigation into all overtime, especially Gimme One including this startling case of Heeber. We have had many reports against this Heeber, and alleged protection from his father who is the Superintendent, but again we could not go into individual matters or we would be sitting at the end of the present century.

CDE. CHUNG - FINANCE CONTROLLER GEC

The total bill for 1,380 workers works out to \$900,000.00. Overtime would be thirty per cent plus. In respect of the daily and weekly work, it would be at about fifty-five per cent. About \$300,000.00 per month would be for overtime.

GEC is understaffed. I know of a system called Gimme One. This is a dishonest practice. It has been going on for many years where the workers get twice as much as they are supposed to get, because another worker feigns illness.

/I....

I know from time to time Personnel has been trying to stop this, Top Management is fully aware of this. Yet it continues. Heeber has allegedly been working for much overtime. One relies on the integrity of the individual and the engineer would sign the certificate without being able to check personally that the overtime was done. I do not deny this is a singular example. It is happening at other stations. I think we should have adequate staff rather than have these inordinate "overtimes". GEC lacks a General Manager. I lack a Chief Accountant and Management Accountant. I have only recently had a Revenue Accountant, appointed.

At the moment we collect \$3.5m per month and we spend \$3.6m per month. We are owed \$12m. Monthly consumers are responsible for \$5m, and Corporations, etc., \$7m.

I have tendered my resignation but have been asked to reconsider it. This will depend on what staff I can get. I need:

1. Chief Accountant.
2. Budget and Statistics Accountant.
3. Data Processing Manager.
4. Assistant Data Processing Manager
5. Systems Analyst.

Recently the Programme Analyst has resigned. I am resigning because of frustration. We are not working as a team. There is bureaucracy, red tape, and then the tail wags the dog and everyone is afraid of the worker. I would like to stay on but I cannot carry the burden I bear.

MONEYS OWING

Above all we appeal to the Prime Minister to issue such directives that the \$7m. of the \$12m. owing might be collected from the Corporations and other public concerns.

The failure to pay for a year and in some cases two years is a sad indictment to the way how some other Corporations are being run.

STRUCTURE

We find GUYSTAC has little or no relevance in the power structure. We feel that their involvement should go, and we advocate a Power Board within two main limbs - one for the Electricity Corporation and the other for Hydro.

The Minister under whose Portfolio, power comes should be the Chairman. We feel that if the present Minister were actively and directly concerned affairs which have developed, the tragedy of unabated negligence would not have enveloped the Corporation.

The structure we suggest is based on the future Generation requirements prepared by Emerson, Richards and Stuart.

Respectfully Submitted:-

Sgd. Sewdial Bhagandas
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